

## Claims

1. A digital signal transmission system comprising a transmission apparatus and a reception apparatus, the digital signal transmission system characterized in  
5 that

the transmission apparatus comprises:

clock generating means for generating a first clock and a second clock;

10 frequency information outputting means for outputting frequency information related to a frequency of the first clock;

first signal processing means for processing a first signal and outputting a first digital signal based on the first clock generated  
15 by the clock generating means;

second signal processing means for processing a second signal and outputting a second digital signal based on the second clock generated by the clock generating means; and

20 transmitting means for transmitting the second clock generated by the clock generating means, the frequency information output by the frequency information outputting means, the first digital signal output by the first signal processing means, and the second digital signal  
25 output by the second signal processing means;

and

the reception apparatus comprises:

receiving means for receiving the signals  
30 transmitted by the transmitting means;

division ratio information generating

means for generating division ratio information,  
which represents a division ratio, based on the  
frequency information extracted from the signals  
received by the receiving means; and

5           clock reproducing means for reproducing  
the first clock based on the second clock  
extracted from the signals received by the  
receiving means and the division ratio  
information.

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2. A digital signal transmission method for a digital  
signal transmission system comprising a transmission  
apparatus and a reception apparatus, the digital  
signal transmission method characterized in that

15           a transmission method of the transmission  
apparatus comprises:

          a clock generating step of generating a  
first clock and a second clock;

20           a frequency information outputting step of  
outputting frequency information related to a  
frequency of the first clock;

          a first signal processing step of  
processing a first signal and outputting a first  
digital signal based on the first clock generated  
25           by the processing of the clock generating step;

          a second signal processing step of  
processing a second signal and outputting a  
second digital signal based on the second clock  
generated by the processing of the clock  
30           generating step; and

          a transmitting step of transmitting the

second clock generated by the processing of the clock generating step, the frequency information output by the processing of the frequency information outputting step, the first digital signal output by the processing of the first signal processing step, and the second digital signal output by the processing of the second signal processing step;

and

a reception method of the reception apparatus comprises:

a receiving step of receiving the signals sent by the processing of the transmitting step;

a division ratio information generating step of generating division ratio information, which represents a division ratio, based on the frequency information extracted from the signals received by the processing of the receiving step; and

a clock reproducing step of reproducing the first clock based on the second clock extracted from the signals received by the processing of the receiving step and the division ratio information.

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3. A transmission apparatus for transmitting a first digital signal and a second digital signal, the transmission apparatus characterized by comprising:

clock generating means for generating a first clock and a second clock;

frequency information outputting means for

outputting frequency information related to a frequency of the first clock;

first signal processing means for processing a first signal and outputting the first digital signal  
5 based on the first clock generated by the clock generating means;

second signal processing means for processing a second signal and outputting the second digital signal based on the second clock generated by the clock  
10 generating means; and

transmitting means for transmitting the second clock generated by the clock generating means, the frequency information output by the frequency information outputting means, the first digital  
15 signal output by the first signal processing means, and the second digital signal output by the second signal processing means.

4. A transmission method for a transmission apparatus  
20 that transmits a first digital signal and a second digital signal, the transmission method characterized by comprising:

a clock generating step of generating a first clock and a second clock;

25 a frequency information outputting step of outputting frequency information related to a frequency of the first clock;

a first signal processing step of processing a first signal and outputting the first digital signal  
30 based on the first clock generated by the processing of the clock generating step;

a second signal processing step of processing a second signal and outputting the second digital signal based on the second clock generated by the processing of the clock generating step; and

5 a transmitting step of transmitting the second clock generated by the processing of the clock generating step, the frequency information output by the processing of the frequency information outputting step, the first digital signal output by  
10 the processing of the first signal processing step, and the second digital signal output by the processing of the second signal processing step.

5. A reception apparatus for receiving a first digital  
15 signal and a second digital signal, the reception apparatus characterized by comprising:

receiving means for receiving the first digital signal, the second digital signal, the frequency information related to a first clock, and a signal  
20 including a second clock, all of which transmitted from a transmission apparatus;

division ratio information generating means for generating division ratio information, which represents a division ratio, based on the frequency  
25 information extracted from the signals received by the receiving means; and

clock reproducing means for reproducing the first clock based on the second clock received by the receiving means and the division ratio information  
30 generated by the division ratio information generating means.

6. The reception apparatus according to claim 5 characterized in that the clock reproducing means comprises:

5       a first dividing means for dividing the second clock extracted from a signal received by the receiving means by a first division ratio and generating a signal of a reference frequency;

          phase comparing means for comparing a phase of  
10 a signal of the reference frequency generated by the first dividing means, with a phase of a signal of a comparison frequency, and outputting a phase error signal;

          smoothing means for smoothing the error signal  
15 output by the phase comparing means;

          oscillating means for oscillating a signal of a constant frequency controlled based on an output from the smoothing means;

          a second dividing means for dividing the signal  
20 of a constant frequency, oscillated by the oscillating means, by a second division ratio based on the division ratio information generated by the division ratio generating means;

          a third dividing means for dividing the signal  
25 generated by the second dividing means, by a third division ratio based on the division ratio information generated by the division ratio information generating means; and

          a fourth dividing means for dividing the signal  
30 generated by the third dividing means, by a fourth division ratio and generating the signal of a

comparison frequency.

7. A reception method for a reception apparatus that receives a first digital signal and a second digital  
5 signal, the reception method characterized by comprising:

a receiving step of receiving the first digital signal, the second digital signal, frequency information related to a first clock, and a signal  
10 including a second clock, all of which transmitted from a transmission apparatus;

a division ratio information generating step of generating division ratio information, which represents a division ratio, based on the frequency  
15 information extracted from the signals received by the processing of the receiving step; and

a clock reproducing step of reproducing the first clock based on the second clock received by the processing of the receiving step and the division  
20 ratio information generated by the processing of the division ratio information generating step.

8. The reception method according to claim 7 characterized in that the clock reproducing step  
25 comprises:

a first dividing step of dividing the second clock extracted from a signal received by the processing of the receiving step, by a first division ratio and generating a signal of a reference  
30 frequency;

a phase comparing step of comparing a phase of

a signal of the reference frequency generated by the processing of the first dividing step, with a phase of a signal of a comparison frequency and generating a phase error signal;

5       a smoothing step of smoothing the error signal generated by the processing of the phase comparing step;

10       an oscillating step of oscillating a signal of a constant frequency based on the signal smoothed by the processing of the smoothing step;

15       a second dividing step of dividing the signal of a constant frequency, oscillated by the processing of the oscillating step, by a second division ratio based on the division ratio information generated by the processing of the division ratio generating step;

20       a third dividing step of dividing the signal, generated by the processing of the second dividing step, by a third division ratio based on the division ratio information generated by the processing of the division ratio generating step; and

25       a fourth dividing step of dividing the signal, generated by the processing of the third dividing step, by a fourth division ratio and generating the signal of a comparison frequency.